



Managing Soybean Cyst Nematode

Key Facts

Soybean cyst nematode (SCN) causes the greatest yield loss of any single pathogen of soybean in Iowa. An estimated 50 million bushels were lost in Iowa to SCN in 2004. Damage from SCN is not limited to yield loss from root feeding; SCN also makes other diseases like sudden death syndrome, iron deficiency chlorosis, Pythium, Phytophthora root and stem rot and brown stem rot worse. Once established in a field, SCN cannot be eradicated. However, the use of multiple management tactics can help minimize yield loss.

Today SCN is found throughout the soybean-producing area in United States (Figure 1) and is the most damaging pathogen of soybean throughout the world. Since SCN can be found throughout most of Iowa, it is important to sample fields frequently to confirm its presence in each field. It is important to keep test results for future reference to determine the impact of your management practices on population densities.

An effective SCN management plan begins with rotating soybean with a nonhost crop such as corn. Producers can expect around 30 to 40 percent reduction in the SCN population densities during a year of a nonhost crop. This is somewhat unpredictable however, because the change in population density varies from year to year and is greatly influenced by environmental conditions. A second year of a nonhost crop, such as two years of corn, will not decrease the SCN population densities as much as the first year of a nonhost crop.

Once established in a field, SCN cannot be eradicated. Therefore, managing SCN is extremely important to increase average yield. Managing SCN can be difficult since no single management tactic will control it. However, the use of multiple management tactics can help minimize yield loss.

The best management program to reduce SCN numbers is the use of SCN-resistant soybean varieties incorporated into a multi-year cycle of rotations with nonhost crops. No yield differences are found today between the highest yielding SCN-resistant and SCN-susceptible varieties when grown in a non-infested environment. If the same resistant variety is grown in the same field year after year, SCN has

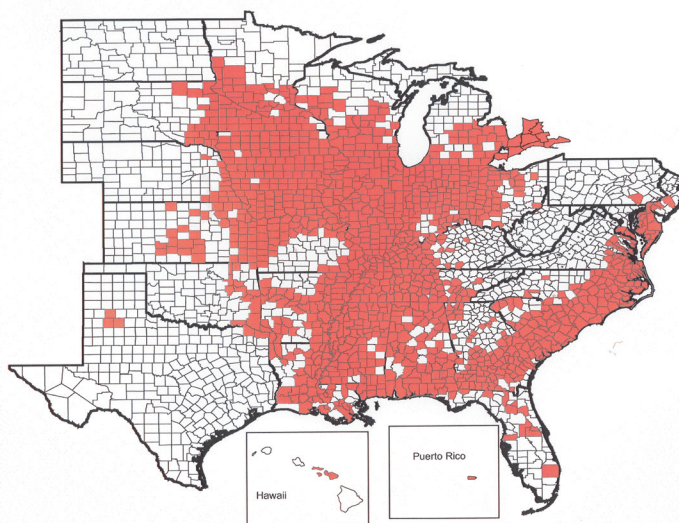


Figure 1. Known distribution of SCN in the U.S. – 2007. (Courtesy T. Niblack; data courtesy R.D. Riggs).

the ability to adapt to the variety, or “break resistance.” To reduce the possibility of this happening, it is recommended that growers alternate use of soybean varieties with different sources of SCN resistance, and that a susceptible variety possibly be grown if SCN the population density is low after all types of available resistance have been rotated. SCN-susceptible varieties should not be grown in infested fields if SCN population densities are greater than 2,000 eggs per 100 cc of soil or if a drought is predicted.

Hidden yield loss

High population densities of SCN can result in large portions of soybean fields with plants that are severely stunted and yellow (Figure 2). However, few aboveground symptoms of SCN are observed. This hidden cause of yield loss has presented a major problem for growers who have not tested their fields for SCN. Moreover, they usually contribute their yield loss to cultural or environmental conditions rather than to SCN. Consequently, SCN infestations remain undetected in the field for years and population densities often reach a level that is difficult to manage.

Growing SCN-resistant soybean varieties is the best and most effective management tool (Figure 3). Planting resistant soybeans in SCN-infested fields will usually reduce reproduction of the nematode. However, not all SCN-resistant varieties are equal; they do not necessarily control the nematode equally. They can vary considerably in effectiveness in their ability to control nematode population densities.



Figure 2. Stunted and uneven canopy and lack of canopy closure in wide rows is often an obvious symptom of soybean cyst nematode. Yield reductions of up to 40% on susceptible varieties are not uncommon without any above ground visible symptoms of nematode damage. Visible above ground symptoms are often not seen in high yielding environments (Courtesy Mike Janssen).

However, producers should avoid selecting SCN-resistant varieties based solely on yield data. Some relatively high-yielding varieties, labeled as SCN-resistant, can allow the nematode population densities to build up. Yield and SCN performance information of SCN-resistant varieties can be found at www.isuscntrials.info.

For more information about soybean management and SCN management go to www.soybeanmanagement.info and www.soybeancyst.info. Information about SCN-resistant varieties and their performance in Iowa can be found at www.isuscntrials.info or at www.croptesting.iastate.edu.



Figure 3. Use of SCN-resistant varieties (right) is an efficient and cheap tool to manage SCN. SCN-susceptible variety is to the left.

How to sample for SCN

The best time to sample fields for SCN is in the fall prior to being planted to soybeans. Samples should be collected before the soil freezes and not when the soil is wet since nematodes are difficult to extract from wet soil. Keep samples away from sunlight and in a cool area until shipped to either a commercial laboratory or to the Iowa State University Plant and Insect Diagnostic Clinic, Iowa State University, 327 Bessey Hall, Ames, IA 50011.

Fields should also be examined directly in July and August for the presence of SCN females on the root surface of soybean plants (Figure 4). Target areas should be areas of high soil pH since there is a correlation with soil pH and SCN population densities. Also target typically poor yielding areas and areas where the canopy is stunted and lack of canopy closure.

During a growing season, SCN can produce up to four generations of nematodes depending on planting date, soil temperature, host plant, maturity group, and soil conditions. It cannot reproduce without a host plant and conditions that favor soybean growth also favor SCN development.



Figure 4. White females of soybean cyst nematode on soybean roots. These females are small can often be seen on the roots 6-8 weeks after emergence.

Key points about SCN:

- Soil sample fields periodically to monitor how management practices are influencing SCN population densities.
- Implement a SCN management plan as soon as SCN is detected.
- Not every SCN-resistant variety is the same. Grow SCN-resistant soybean varieties that produce high yields and also keep the nematode population densities in check.
- The goal of soybean management in a SCN environment is to improve soybean canopy, health and yield.
- SCN will often increase yield loss from other diseases like sudden death syndrome, iron deficiency chlorosis, Pythium, Phytophthora root and stem rot, and brown stem rot, if not managed.
- SCN will reduce soybean root system size and nodulation. Yield loss from SCN is often more obvious in a dry year or on sandy soils where soil moisture is limited.
- SCN has other host crops like many weeds. Good management of weeds, water, and soil fertility will minimize the compounding damage of SCN.

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